

No. 725,229.

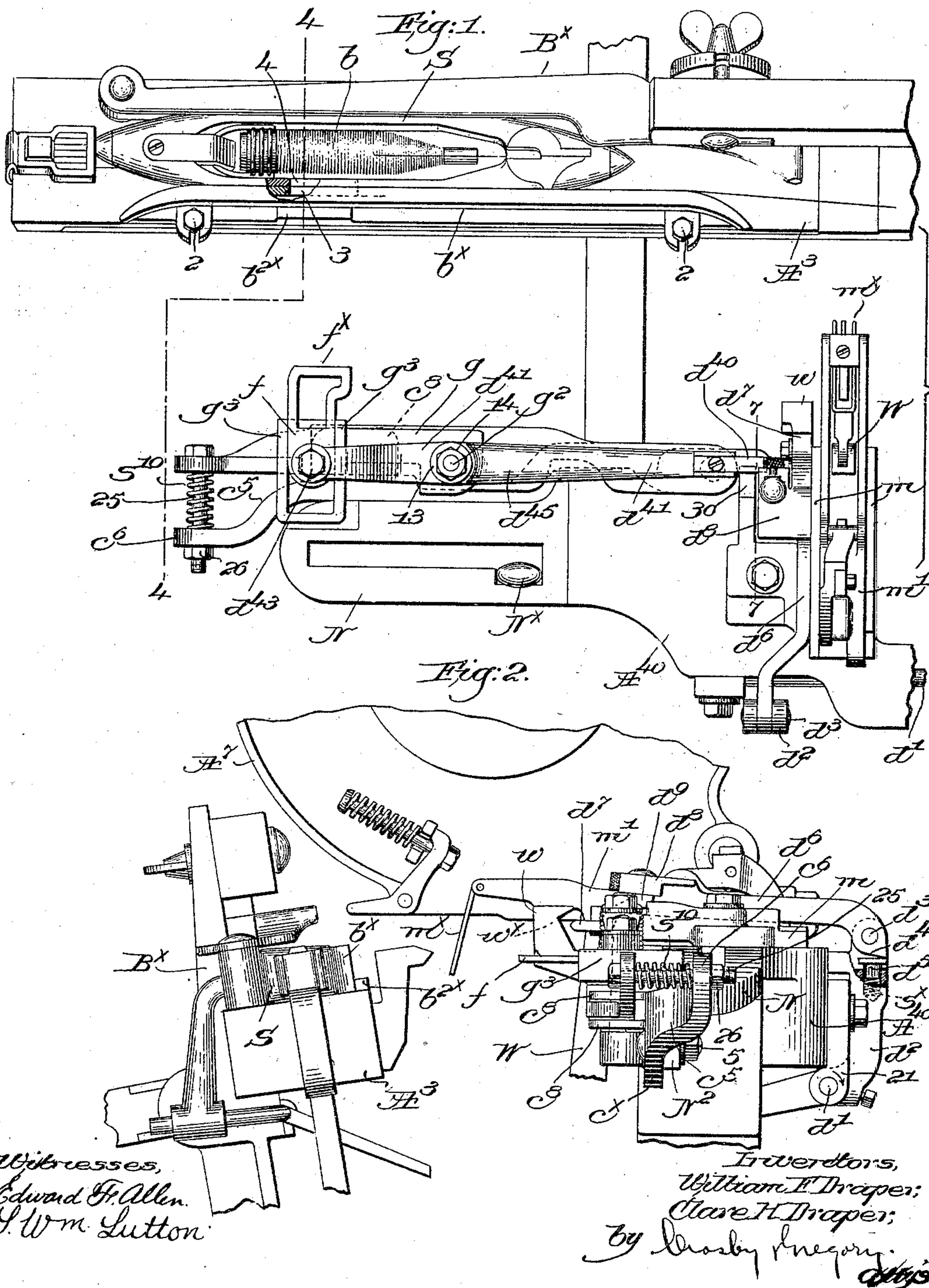
PATENTED APR. 14, 1903.

W. F. & C. H. DRAPER.
AUTOMATIC FILLING REPLENISHING LOOM.

APPLICATION FILED NOV. 4, 1902.

NO MODEL.

2 SHEETS—SHEET 1.



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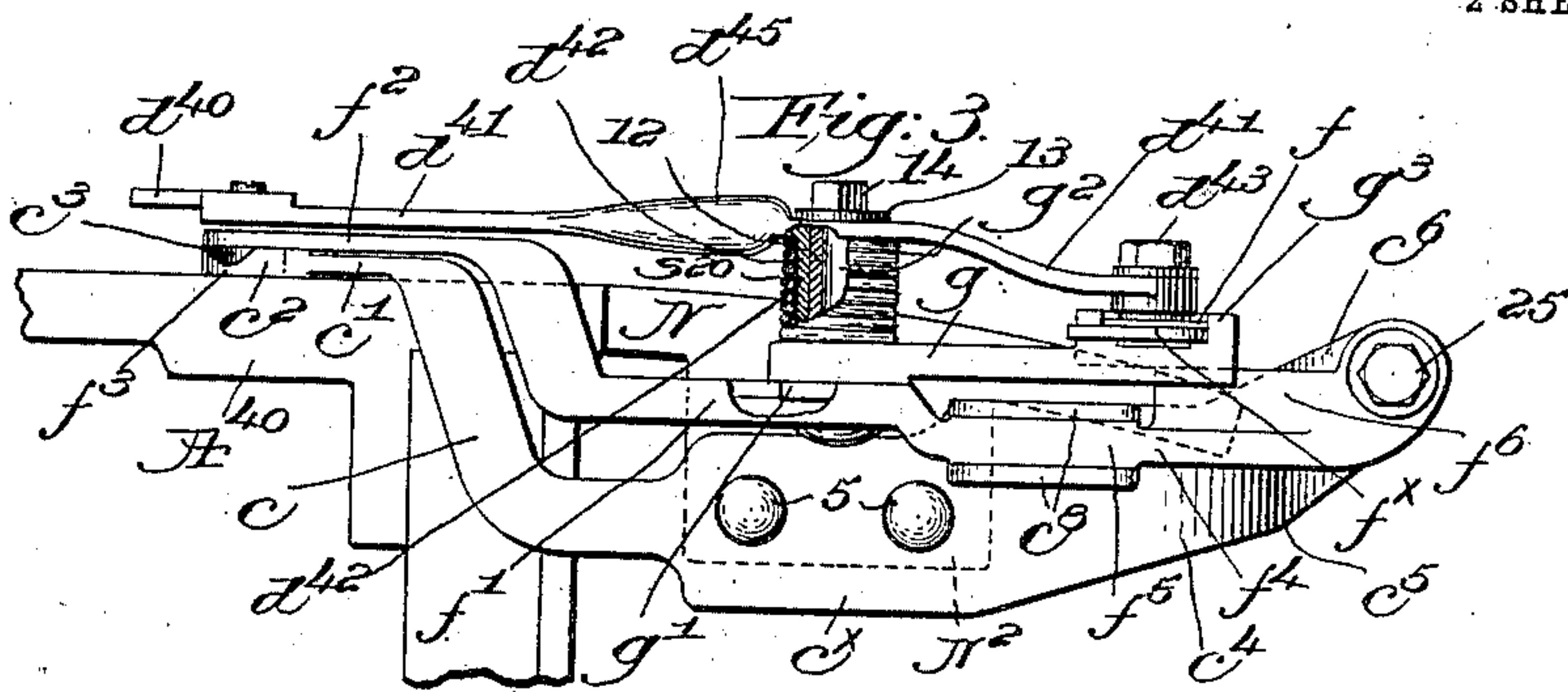
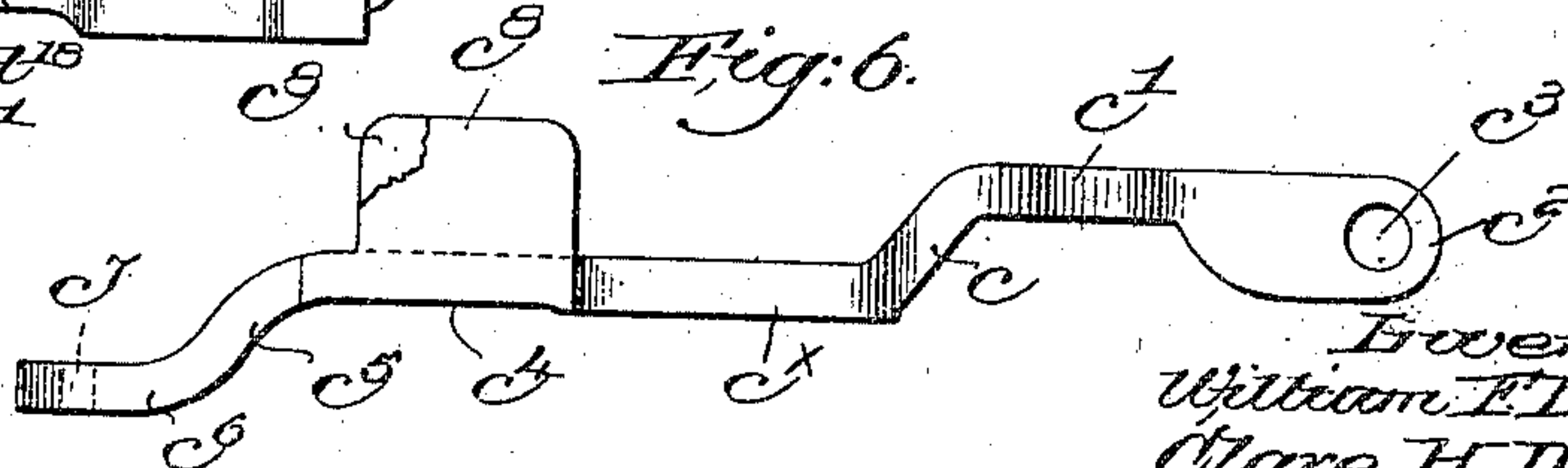
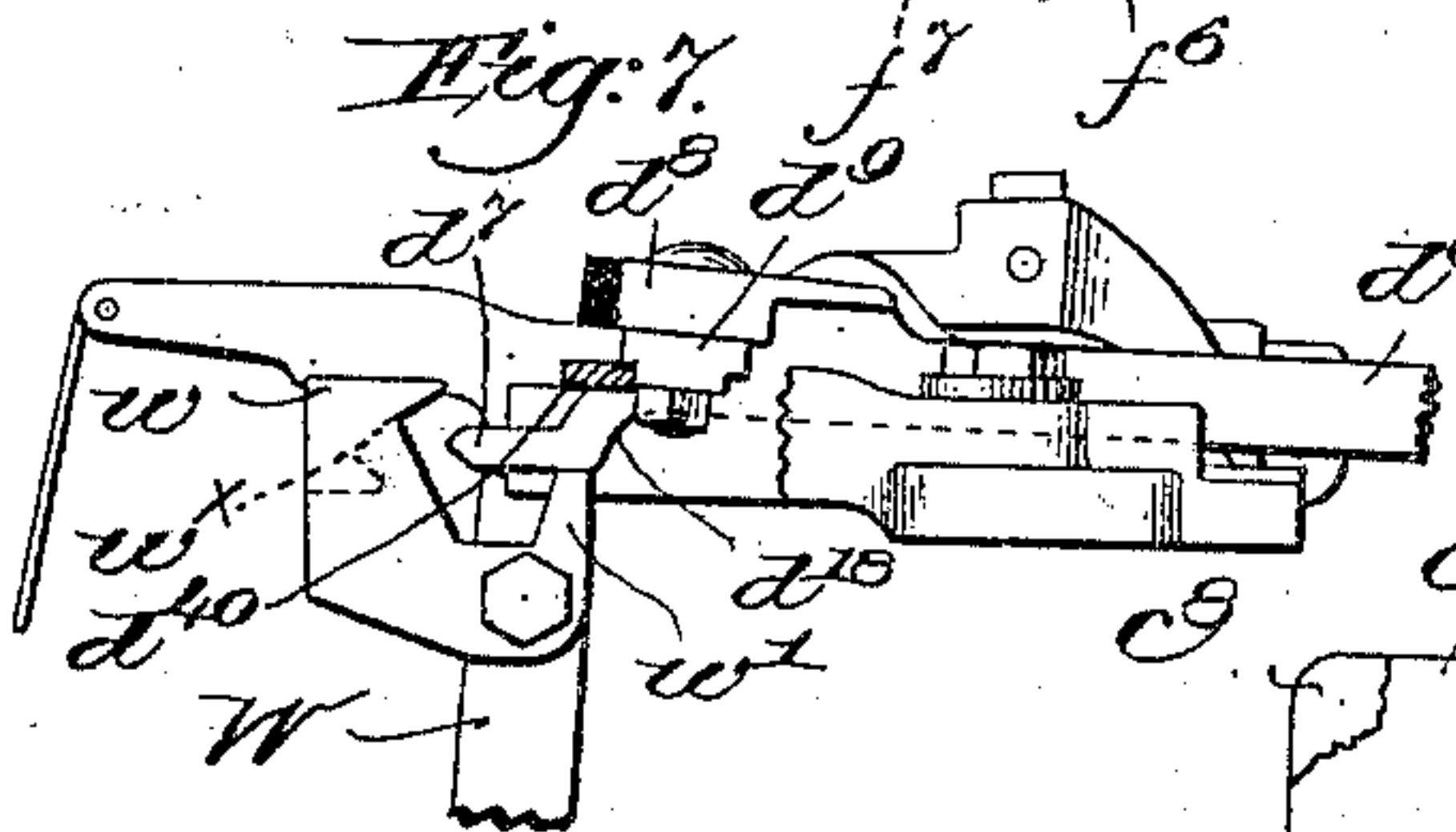
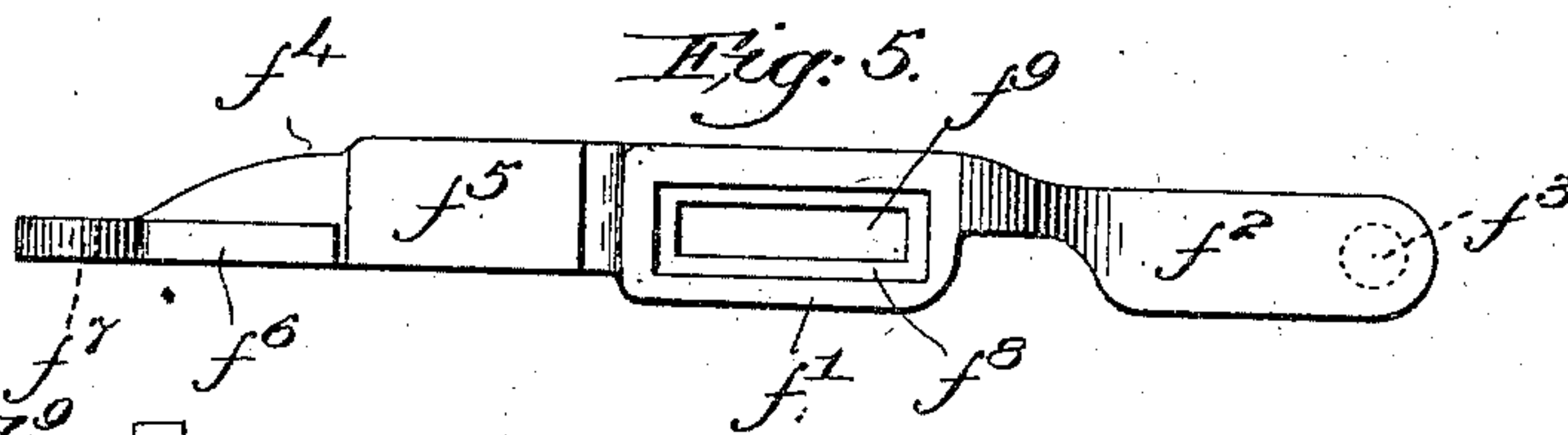
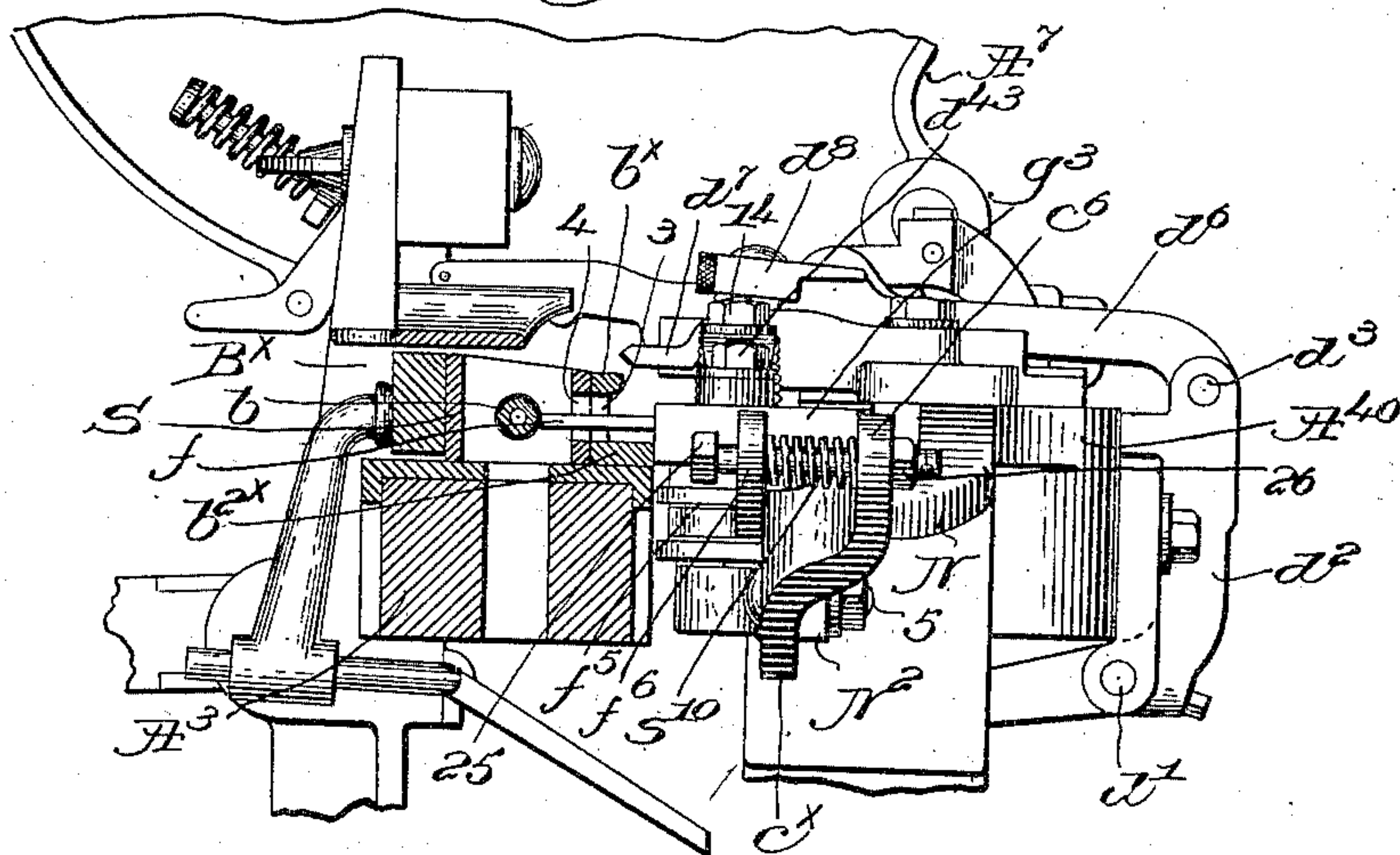


Fig: 4.



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UNITED STATES PATENT OFFICE.

WILLIAM F. DRAPER AND CLARE H. DRAPER, OF HOPEDALE, MASSACHUSETTS, ASSIGNORS TO DRAPER COMPANY, OF HOPEDALE, MASSACHUSETTS, A CORPORATION OF MAINE.

AUTOMATIC FILLING-REPLENISHING LOOM.

SPECIFICATION forming part of Letters Patent No. 725,229, dated April 14, 1903.

Application filed November 4, 1902. Serial No. 130,061. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM F. DRAPER and CLARE H. DRAPER, citizens of the United States, and residents of Hopedale, county of Worcester, State of Massachusetts, have invented an Improvement in Automatic Filling-Replenishing Looms, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

This invention relates to looms the operation whereof is controlled by or through a feeler in accordance with the condition of the filling in the shuttle, a change in the operation of the loom, such as a replenishment of filling or stoppage of the loom, being effected automatically upon substantial exhaustion of the filling in the running or working shuttle. Looms of this type are well known to those skilled in the art and are frequently designated as "feeler-looms," owing to the important function performed by the feeler. In such looms the feeler intermittently engages and is moved or vibrated by the filling in the shuttle as the lay beats up, the filling-induced movement of the feeler gradually decreasing in amplitude as the filling weaves off until only so much remains in the shuttle as will cross the lay a few times. When such substantial filling exhaustion is reached, a stoppage of the loom or a replenishment of filling is effected by suitable means, the feeler at such time having no filling-induced movement at all or so slight a movement as will serve to effect the desired change in the operation of the loom. The feeler usually enters the shuttle through a hole in its side wall and contacts with the filling as the lay beats up, and manifestly the less the thickness of filling interposed between the bobbin or filling-carrier and the contact end of the feeler the shorter will be the filling-induced movement of the latter, so that by adjusting the feeler and cooperating parts the waste or quantity of filling remaining in the shuttle when the operation of the loom is changed will be very small. Such adjustment is in actual practice modified or affected by variability in the movement of the lay, due

principally to changes in the speed of the loom and the looseness of connections, so that at one speed the lay when on front center may overrun or not quite reach the point reached by it when the loom is running at a different speed, and if the feeling mechanism is adjusted for a given speed changes in the latter tend to throw the adjustment out very materially. Thus the feeler may effect a change in the operation of the loom too soon, with consequent waste of filling, or it may be so delayed that the whole object of the device is defeated. We have herein devised novel means for overcoming or preventing such faulty operation of the feeler and in such a manner that great accuracy is attained in the control of the loom by or through the feeler.

It is well known that the front wall of the shuttle-box is frequently adjusted in order that the shuttle shall box properly, according to the size of the shuttle, the action of the picking mechanism, and other circumstances, and obviously a change in the front box-wall will effect a corresponding change in the position of the shuttle when boxed. Inasmuch as the feeler must maintain a fixed relation with the longitudinal axis of the shuttle in order to properly feel the filling therein, means have been provided for effecting such positioning by or through the shuttle itself and also by means independent of the shuttle. Our present invention is of the latter type, and we have provided means to properly position the feeler by or through the front wall of the shuttle-box on the forward beat of the lay, so that when the weaver finds it necessary to adjust such front wall, thereby changing the position of the longitudinal axis of the shuttle when boxed, there will be a corresponding correction made automatically when the feeler is positioned for its feeling action.

The various novel features of our present invention will be fully described in the subjoined specification and particularly pointed out in the following claims.

Figure 1 is a top or plan view of a portion of the left-hand side of a loom with the lay

back and with one embodiment of our present invention applied thereto. Fig. 2 is a left-hand side elevation of the parts shown in Fig. 1, a part of the filling-feeder stand of a filling-replenishing mechanism being shown. Fig. 3 is a rear elevation of the feeler, feeler-support, and stand, mounted opposite the left-hand shuttle-box of the lay. Fig. 4 is a partial sectional view on the irregular line 4-4, Fig. 1, looking toward the right, but with the lay on its front center, it being supposed that the filling in the shuttle has been substantially exhausted. Fig. 5 is a top plan view of the feeler-support detached. Fig. 6 is a similar view of the stand on which said feeler-support is fulcrumed; and Fig. 7 is a side elevation, enlarged, of the latch and its actuator on the line 7-7, Fig. 1, looking toward the right.

The breast-beam A^{40} , lay A^3 , having a shuttle-box B^x thereon, the front wall b^x of the shuttle-box, adjustably secured upon the lay by bolts 2 2 and having an aperture 3, the stand A^7 , on which a filling feeder or hopper is mounted, the notched holding-plate N for the shipper N^x , Fig. 1, the automatically self-threading shuttle S to contain a supply of filling, such as a filling-carrier or bobbin b , and having a hole 4 in its front side wall, may be and are all of usual or well-known construction—such, for instance, as in United States Patent No. 648,986, dated May 8, 1900. The filling-replenishing mechanism may be conveniently of the type shown in such patent, and a rock-shaft d' for controlling the operation of the loom—as, for instance, to effect a change of filling—is shown mounted in suitable bearings below the breast-beam. Herein the rock-shaft d' has secured to it an upturned arm d^2 , projecting above the breast-beam and having pivoted to it at d^3 the outer end of a latch d^6 , the latter extending across and beyond the breast-beam and having a reduced end d^7 and a beveled or cam face d^{18} on its under edge. (See Fig. 7.) The weft-hammer W has secured to its upper end an upturned head w , provided with a notched bunter w^x (see dotted lines, Figs. 2 and 7) to at times engage the end d^7 of the latch and move it outward to rock the arm d^2 and turn the rock-shaft d' in the direction of arrow 21. An upright projection w' on the head w travels beneath the end d^7 of the latch, and at times it coöperates with the cam-face d^{18} , as will be referred to hereinafter. The latch is located at one side of the guide or stand m for the slide m' of the usual filling-fork m^x , and said latch has a lateral enlargement d^8 , on the under side of which is adjustably mounted a notched block d^9 , Figs. 2 and 7, substantially as provided for in United States Patent No. 677,607, dated July 2, 1901. A dog, to be described, when in engagement with the notched block d^9 holds the latch lifted, with its end d^7 in the path of the bunter w^x , as the weft-hammer moves forward; but when the dog is withdrawn by or through

filling-induced movement of the feeler the latch drops, so that its end d^7 is below the bunter, the latch then being inoperative, the projection w' having passed from beneath the part d^7 before the bunter has moved forward enough to engage it. When the weft-hammer swings back, the projection w' acts on the cam-face d^{18} and lifts the latch into the position shown in Fig. 7, so that the dog can pass beneath the block d^9 , as before. In order to accelerate the movement of the latch to inoperative position, a plunger d^5 , Fig. 2, is mounted in a socket in the top of the arm d^2 to bear on the cam-face d^4 of the latch outside of its pivot d^3 , a spring s^x serving to press the plunger upward, and thereby to assist gravity in depressing the rear end d^7 of the latch.

We have shown a depending bracket or apron N^2 on the holding-plate N , Figs. 2, 3, and 4, to which is rigidly secured by bolts 5 a stand c^x , on which the feeler-support is mounted to swing in a lateral path. This stand, as best shown in Figs. 3, 4, and 6, is of peculiar shape, its inner end being upturned, as at c , back of the breast-beam and then bent over at c' , with an enlargement or boss c^2 , having a socket c^3 therein, the bottom of the boss resting on the top of the breast-beam. The opposite end of the stand is extended upward in a diagonal direction, as at c^4 , and bent to clear the end of the holding-plate, as at c^5 , the extremity c^6 of the extension being substantially parallel to the main part c^x and having a threaded hole c^7 therein. On the rear face of the part c^4 are formed two parallel rearwardly-extended ears c^8 , which constitute a guide and support for the outer free end of the swinging feeler-support and also serve to prevent it from lifting on its fulcrum. The feeler-support is best shown in Figs. 3 and 5, it being made as a casting having a body portion f' , terminating at one end in an upturned and then longitudinal flattened extension f^2 , provided with a fulcrum-pin f^3 to enter the socket c^3 of the stand. At its other end the body has a dropped extension f^4 of such thickness at f^5 that it will freely enter between the ears c^8 of the stand, and there is an upright longitudinal web f^6 , extending to the outer end of the part f^4 , said web having a hole f^7 therein which is opposite the hole c^7 of the stand when the feeler-support is in position. An elongated recess f^8 is made in the body portion of the feeler-support, with a longitudinal slot f^9 , and the recess receives a lug g' on the bottom of a feeler-guide g , shown as an arm which projects toward the outer end of the feeler-support and overhangs the ears c^8 , Fig. 3. A headed bolt g^2 passes up through the slot f^9 and the guide g , extending above the top of the latter and through a sleeve or bushing 12, a washer 13, and nut 14 on the bolt, serving to clamp the feeler-guide in proper position on the feeler-support. The outer end of the guide has transverse parallel ribs g^3 on its upper face, (shown

in Fig. 1 as connected at their outer ends,) and the feeler f is slidably mounted between them, the feeler being cut out or open at its rear end to lighten it and having an elongated feeling-face f^x . The guide g is longitudinally adjusted on the feeler-support until the feeler is directly opposite the opening 3 of the front box-wall b^x , when the lay beats up, the feeler at such time passing through the opening, and if the shuttle is boxed the feeler enters the shuttle through the hole 4. A threaded headed stud 25 is passed loosely through the hole f^7 in the outer end of the feeler-support, and then it is screwed into the hole c^7 in the stand, a check-nut 26 holding the stud fast, and a spring s^{10} is coiled around the stud between the end c^6 of the stand and the web f^6 , just behind it, to swing the feeler-support rearward against the head of the stud. The usual flat base or flange of the box-wall b^x is herein shown as enlarged or thickened at b^{2x} to engage the outer end of the feeler-guide below the feeler when the lay beats up, such part of the feeler-guide constituting a bunter, to thereby swing the feeler-support outward on its fulcrum f^3 against the spring s^{10} , as in Fig. 4. The stop-stud 25 is so adjusted that the front box-wall will always thus move the feeler-support on the forward beat of the lay, no matter whether the running speed of the loom may drop for a considerable number of picks per minute below the normal rate and irrespective of any adjustment of the box-wall. Consequently the feeler-guide will always maintain a certain fixed position relative to the longitudinal axis of the shuttle when the lay is on front center, and the feeler will be properly positioned for feeling action whenever the shuttle is in the box B^x —that is, on every other pick. The feeler is moved outward in its guide by engagement with the filling in the shuttle on alternate picks against the action of a spring, to be referred to, and such filling-induced movement of the feeler acts to move a dog-carrier and periodically withdraw the dog from the block d^9 , rendering the latch inoperative until substantial exhaustion of the filling. The dog is shown herein as a plate d^{40} , preferably of hardened steel, mounted on the end of a carrier, (shown as an arm d^{41}), having a downturned hub d^{42} to loosely embrace the sleeve or bushing 12 around the clamping-bolt g^2 , before described, the washer 13 projecting over the arm and holding it in place. The inner end of the dog-carrier overhangs the fulcrum f^3 of the feeler-support, and the dog slides on the upper face 30 of a part of the stand or guide for the filling-fork slide m' , while the outer end of the carrier is loosely and pivotally connected with the feeler by a pin d^{43} , secured to and upturned from the feeler. The inner lever-arm of the dog-carrier is the longer, so that the movement of the dog is greater than the stroke of the feeler. A spring s^{20} , surrounding the hub d^{42} of the carrier, is fixed at one end and at its other end

engages the carrier, the spring being so wound that it tends to project the feeler rearward and maintain the dog in engagement with the notched block d^9 . Filling-induced movement of the feeler is resisted by the spring, the latter effecting the return movement of the feeler and bringing the dog back to coöperate with the latch in well-known manner. Manifestly when the filling-induced movement of the feeler is too slight to withdraw the dog, as when the filling in the shuttle has been woven off to the desired extent, the latch will be engaged by its actuator (the weft-hammer) and moved to effect a change in the operation of the loom. If the front box-wall is changed after the feeler has been adjusted to effect the change in operation when the filling has been exhausted to a desired extent, the proper operation of the feeler will not be altered or interfered with by the construction hereinbefore described, and the same is true as concerns irregular movements of the lay. When the loom is running at high speed and the filling has been exhausted to the desired extent, the sudden swing of the feeler-support as the lay beats up tends to throw or jar the dog out of engagement with the latch, and to prevent this we have increased the weight of the dog-carrier by thickening it at d^{45} between its fulcrum and the dog. The swing of the feeler-support acts to cause this weighted part to hold the dog in engagement with the latch, though it does not interfere with proper filling-induced movement of the feeler before there is a substantial exhaustion of filling in the shuttle.

Our invention is not restricted to the precise construction and arrangement herein shown and described, for the same may be modified or changed in various particulars without departing from the spirit and scope of the invention.

Having fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In a loom, a lay, a shuttle-box thereon, means, including a feeler, to control the operation of the loom, substantial exhaustion of the filling in the shuttle acting through the feeler to effect the actuation of said means, and a device moved by engagement with the wall of the shuttle-box on the beat of the lay, to properly position the feeler for its feeling action.

2. In a loom, a lay, a shuttle-box thereon, having an adjustable front wall, means, including a feeler, to control the operation of the loom, substantial exhaustion of the filling in the shuttle acting through the feeler to effect the actuation of said means, and a device moved by engagement with the front wall of the shuttle-box on the forward beat of the lay, to properly position the feeler for its feeling action.

3. In a loom, a lay, a shuttle-box thereon, means, including a feeler, to control the op-

eration of the loom, substantial exhaustion of the filling in the shuttle acting through the feeler to effect the actuation of said means, and a movable support on which the feeler is
5 mounted and relatively movable, the support being engaged and moved by the front wall of the shuttle-box on the forward beat of the lay to properly position the feeler for its feeling action upon the filling in the shuttle.

10 4. In a loom, a lay having a shuttle-box thereon, a shuttle to contain a supply of filling, means to control the operation of the loom, said means including a feeler to intermittingly engage and be moved by the filling
15 in the shuttle until substantial exhaustion of such filling, filling-induced movement of the feeler acting to maintain said means inoperative, and a movable feeler-support upon which the feeler is mounted and has its filling-induced
20 movement, the front wall of the shuttle-box engaging and moving the feeler-support on the forward beat of the lay, to position the feeler with respect to the longitudinal axis of the filling in the shuttle when the
25 latter is boxed.

5. In a loom provided with filling-replenishing mechanism, a lay having a shuttle-box thereon, a shuttle to contain a supply of filling, means to control the operation of said
30 mechanism, said means including a feeler, and a movable feeler-support upon which the feeler is yieldingly sustained, the front wall of the shuttle-box moving the feeler-support on the forward beat of the lay to present the
35 feeler properly to intermittingly engage and feel the filling in the shuttle.

6. In a loom, a lay provided with a shuttle-box having an adjustable front wall, a shuttle to contain a supply of filling, means to control the operation of the loom, said means including a feeler intermittingly moved by the
40 filling in the shuttle upon alternate picks until substantial exhaustion of such filling, and a swinging feeler-support upon which the feeler is yieldingly mounted, the said support being engaged by the front wall of the shuttle-box on the forward beat of the lay to properly position the feeler relatively to the
45 longitudinal axis of the filling in the shuttle, in accordance with the adjustment of the front wall of the shuttle-box and irrespective of irregular movements of the lay.

7. In a loom provided with filling-replenishing mechanism, a lay, having a shuttle-box
55 thereon, a shuttle to contain a supply of filling, means, including a feeler, to control the time of operation of said mechanism, presence of a substantial amount of filling in the shuttle acting through the feeler to prevent the
60 operation of said means, and means governed by engagement with the front wall of the shuttle-box on the forward beat of the lay to prevent accelerated or retarded action of the feeler due to variable movement of the lay.

65 8. In a feeler-loom, a fixed stand, a feeler-support fulcrumed at one of its ends on the stand and having a sliding connection with

the latter near its other end, a spring to move the support in one direction, an adjustable stop therefor, mounted on the stand, a spring-
70 controlled feeler carried by the support and movable relatively thereto, and a guide on the support to govern the movement of the feeler thereupon.

9. In a feeler-loom, a fixed stand having an
75 upturned end, and a horizontal guide projecting from the face of the stand near its other end, a feeler-support fulcrumed at one end on the upturned end of the stand and in sliding engagement at or near its free end with
80 the guide, a substantially horizontal feeler-guide at the free end of and transverse to the support, a filling-feeler slidably mounted in the guide, and means to yieldingly control the movement of the feeler in its guide. 85

10. In a loom, the lay having a shuttle-box thereon provided with an apertured front wall, a shuttle to contain a supply of filling and having an opening in its side, a feeler-support fixedly fulcrumed at one end opposite
90 the shuttle-box and provided with a bunter to engage the front wall of the shuttle-box on the forward beat of the lay, a spring and an adjustable stop, to govern the movement of the support toward the lay, a feeler-guide on
95 the free end of the support, a feeler slidably mounted in the guide and adapted to pass through the shuttle-box wall and enter the shuttle on alternate beats of the lay, to feel the filling in the shuttle and be moved there-
100 by until substantial exhaustion of such filling, a member to control the operation of the loom, an actuator for said member, and connections between the latter and the feeler to prevent coöperation of the actuator and said
105 member until substantial exhaustion of the filling in the shuttle, movement of the feeler-support by the front wall of the shuttle-box positioning the feeler properly for its feeling action. 110

11. In a loom, means to control its operation, a lay having a shuttle-box thereon, a shuttle to contain a supply of filling, an actuator for said means, the latter including a feeler, a latch maintained inoperative by the presence
115 and rendered operative by the substantial exhaustion of filling in the shuttle, acting by or through the feeler, the actuator then co-operating with the latch to effect a change in the operation of the loom, and a movable,
120 spring-controlled feeler-support on which the feeler is movably mounted, said support having a bunter to be engaged and moved by the front wall of the shuttle-box on the forward beat of the lay, to bring the feeler into posi-
125 tion with relation to the longitudinal axis of the shuttle to coöperate properly with the filling therein on alternate beats of the lay.

12. In a loom, a lay having a shuttle-box thereon, a shuttle to contain a supply of fill-
130 ing, means to control the operation of the loom, and an actuator for said means, the latter including a feeler to intermittingly engage and be moved by the filling in the shut-

5 tle until substantial exhaustion of such filling, a latch, a dog to maintain it operative, a swinging, spring-controlled carrier for the dog, pivotally connected at one end with the
 10 feeler, and a movable feeler-support on which the carrier is fulcrumed and having a guide for the feeler, the feeler-support being moved upon the forward beat of the lay by engagement with the front wall of the shuttle-box,
 15 to properly position the feeler, filling-induced movement of the feeler swinging the carrier and through the dog rendering the latch inoperative, substantial exhaustion of the filling in the shuttle permitting the dog to retain the latch in position to be engaged by the actuator, and thereby to effect the operation of the controlling means for the loom.

20 13. In a loom provided with filling-replenishing mechanism, a lay provided with a shuttle-box, a shuttle to contain a supply of filling, a swinging feeler-support moved by the front wall of the shuttle-box on the forward beat of the lay, a spring to move it oppositely, means to regulate such latter movement, a
 25 feeler slidably mounted on the feeler-support, to intermittently engage and be moved by the filling in the shuttle as the lay beats up, a latch, a dog to maintain it operative, and a swinging, spring-controlled carrier for the
 30 dog, fulcrumed on the feeler-support and operatively connected with the feeler, to be swung by filling-induced movement of the latter, thereby withdrawing the dog and rendering the latch inoperative intermittently
 35 until substantial exhaustion of the filling in the shuttle, combined with an actuator to cooperate with and move the latch when operative, and controlling connections between the latch and the replenishing mechanism, to effect the operation of the latter when the actuator moves the latch.

40 14. In a feeler-loom, a fixed stand, a feeler-support fulcrumed at one of its ends on the stand and having a sliding connection with the latter near its other end, a spring to move the support in one direction, an adjustable

stop therefor, mounted on the stand, a longitudinally-adjustable feeler-guide on the support, a feeler slidably mounted in said guide, a dog-carrier fulcrumed on the guide and operatively connected at one end with the feeler, a dog on the opposite end of the carrier, and a spring to swing the carrier oppositely to movement thereof due to filling-induced action of the feeler.

15. In a feeler-loom, a fixed stand, a feeler-support fulcrumed at one of its ends on the stand and having a sliding connection with the latter near its other end, a spring to move the support in one direction, an adjustable
 60 stop therefor, mounted on the stand, a feeler-guide on the outer end of the support, a feeler slidably mounted in said guide, a dog-carrier fulcrumed on the feeler-support and weighted adjacent its fulcrum, the outer end of the carrier being operatively connected with the feeler, a dog, on the inner end of the carrier, and a spring to control the swinging movement of the carrier and therethrough to move the feeler in opposition to filling-induced movement of the feeler.

16. In a loom, a lay having a shuttle-box thereon, a shuttle to contain a supply of filling, means, including a feeler, to control the operation of the loom, substantial exhaustion
 75 of the filling in the shuttle acting through the feeler to render said means operative, a spring-controlled feeler-support fixedly fulcrumed at its inner end and having the feeler mounted on its free, outer end, and a bunter on the
 80 feeler-support, to be engaged and moved by the front wall of the shuttle-box to properly position the feeler for its feeling action on the forward beat of the lay.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

WILLIAM F. DRAPER.
 CLARE H. DRAPER.

Witnesses:

GEORGE OTIS DRAPER,
 ERNEST W. WOOD.